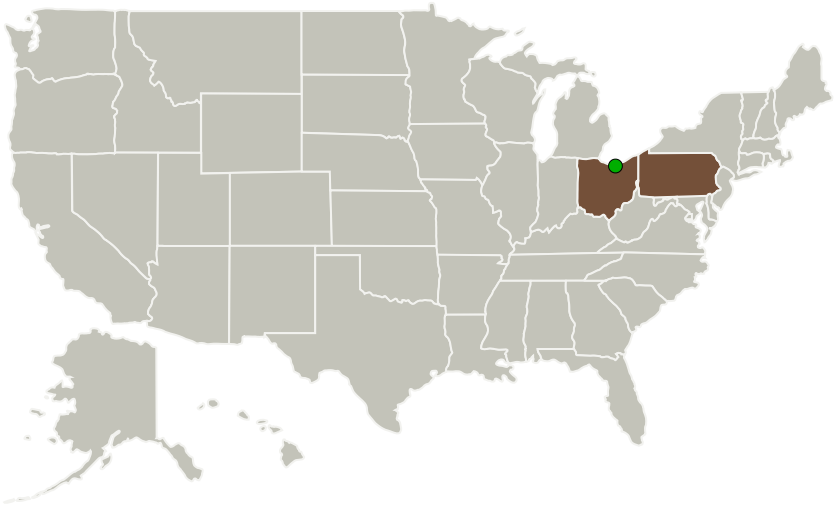
Wideband Single Crystal Transducer for Bone Characterization, Phase II

Completed Technology Project (2012 - 2015)

Project Introduction

TRS proposes to develop a simple-to-use, launch capable, ultrasound transducer that is capable of producing the necessary bandwidth to accurately determine in vivo bone characteristics that correlate to loss of strength in astronauts in long-duration space flights (microgravity). The transducer will be capable of measuring backscatter, attenuation, reflectivity and other ultrasound parameters of bone in the spine or hip that have been correlated with physiological bone density, structure and porosity through systems that provide high fidelity but are not space-capable. The Phase I program showed that a compact ultrasound transducer with more than 4 octave bandwidth could be produced using the special properties of single crystal piezoelectrics and special processing techniques, a bandwidth 175% larger than that of conventional transducers. The Phase II program will extend the capabilities of the Phase I transducer by providing more sensitivity, and optimizing the frequency content relative to the acoustic field. Additionally, TRS will team with Stony Brook University to further analyze the relationship between the bone structure and ultrasound parameters towards eventual use in space. TRS will deliver a robust, wideband transducer that can be integrated with NASA components at the end of the program.

Primary U.S. Work Locations and Key Partners



Wideband Single Crystal Transducer for Bone Characterization Project Image

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Organizations Performing Work	Role	Type	Location
TRS Ceramics, Inc.	Lead Organization	Industry	State College, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Pennsylvania

Project Transitions

April 2012: Project Start

February 2015: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137385)*

Images

Project Image
Wideband Single Crystal Transducer for Bone Characterization Project Image *(https://techport.nasa.gov/image/136973)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
TRS Ceramics, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

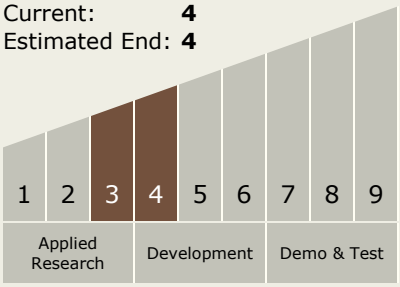
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Kevin A Snook

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.1 Medical Diagnosis and Prognosis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System